

Requested Patent: EP0256170A1

Title:

PAPER OBJECT PRINTED WITH INK AND COATED WITH A PROTECTIVE LAYER,  
AND PROCESS FOR PRODUCING IT ;

Abstracted Patent: EP0256170 ;

Publication Date: 1988-02-24 ;

Inventor(s):

PLANTENGA TJALLING MEINOUD; MULDER GERARDUS JOHANNES; WOTTE  
JOHAN ;

Applicant(s): ENSCHEDE\_ZONEN GRAFISCH (NL) ;

Application Number: EP19860201435 19860819 ;

Priority Number(s): EP19860201435 19860819 ;

IPC Classification: B41M7/02; C09D11/12; C09D11/02 ;

Equivalents: CA1271373, DE3668138D, PH24646, US4830902 ;

ABSTRACT:

PAPER PRINTED WITH INK THAT CONTAINS MICRONIZED WAX IS COATED WITH  
CELLULOSE ESTER OF ETHER. THEREBY IT BECOMES SOIL-REPELLING AND ITS  
USEFUL LIFE-TIME INCREASES CONSIDERABLY. ESPECIALLY APPLICABLE TO BANK  
NOTES

19



Europäisches Patentamt  
European Patent Office  
Office européen des brevets

11

Publication number:

**0 256 170  
A1**

12

## EUROPEAN PATENT APPLICATION

21 Application number: 86201435.4

51 Int. Cl. 4: **B41M 7/02**, **C09D 11/12**,  
**C09D 11/02**

22 Date of filing: 19.08.86

43 Date of publication of application:  
24.02.88 Bulletin 88/08

64 Designated Contracting States:  
**AT BE CH DE FR GB IT LI LU NL SE**

71 Applicant: **Joh. Enschedé en Zonen Grafische  
Inrichting B.V.**  
**P.O. Box 114 Klokhuisplein 5**  
**NL-2000 AC Haarlem(NL)**

72 Inventor: **Plantenga, Tjalling Melnoud**  
**Maartenplein 3**  
**NL-3633 EJ Vreeland(NL)**  
Inventor: **Mulder, Gerardus Johannes**  
**Prof. de Vrijerlaan 6**  
**NL-3984 JL Odijk(NL)**  
Inventor: **Wotte, Johan**  
**Vincent van Goghsingel 8**  
**NL-2182 LN Hillegom(NL)**

74 Representative: **Kroesen, Johan Albert Carel**  
**et al**  
**Octrooibureau Vriesendorp & Gaade**  
**Postbus 266**  
**NL-2501 AW The Hague(NL)**

54 Paper object printed with ink and coated with a protective layer, and process for producing it.

57 PAPER PRINTED WITH INK THAT CONTAINS MICRONIZED WAX IS COATED WITH CELLULOSE ESTER OF ETHER. THEREBY IT BECOMES SOIL-REPELLING AND ITS USEFUL LIFE-TIME INCREASES CONSIDERABLY. ESPECIALLY APPLICABLE TO BANK NOTES

**EP 0 256 170 A1**

**PAPER OBJECT PRINTED WITH INK AND COATED WITH A PROTECTIVE LAYER, AND PROCESS FOR PRODUCING IT.**

THIS INVENTION RELATES TO PAPER PRINTED WITH INK AND COVERED BY A PROTECTIVE COATING, AND TO A PROCESS FOR PRODUCING THE SAME. MORE IN PARTICULAR THE INVENTION RELATES TO PROVIDE PAPER CURRENCY, DOCUMENTS AND OTHER KINDS OF PRINTED MATTER THAT ARE SUBJECT TO INTENSIVE CIRCULATION AND FREQUENT USE WITH A PROTECTIVE LAYER  
 5 TO COUNTERACT SOILING SO THAT THEY MAY HAVE A LONGER USEFUL LIFE. AS THE USEFUL LIFE-TIME OF PAPER CURRENCY IS MAINLY DETERMINED BY THE SOILING OF THE BANK NOTES IN CIRCULATING IT IS QUITE WORTH-WHILE TO MAKE SUCH PAPER CURRENCY MORE OR LESS DIRT-REPELLING.

THE COATING OF PAPER CURRENCY WITH A THIN LAYER OF POLYAMIDE IS KNOWN;  
 10 SINCE 1955 DUTCH BANK NOTES CARRY A COATING OF ULTRAMID<sup>®</sup>. HOWEVER, THE EFFECT OF THIS POLYAMID COATING IS NOT YET SATISFACTORY; IT DOES ADD TO THE STRENGTH OF THE PAPER AND TO KEEPING THE PAPER CLEAN TO ENHANCE ITS LIFE-TIME BUT THESE EFFECTS ARE QUITE LIMITED. AND IT SEEMS THAT DIRT OF A LIPOPHILIC NATURE MAY EVEN BE ATTRACTED RATHER THAN REPELLED.

15 MOREOVER COATING PRINTED PAPER CREATES THE PROBLEM THAT THE COATING DOES NOT ADHERE WELL TO THE PRINTED PARTS, ESPECIALLY IF THE PRINTING INK CONTAINS WAX.

NOWADAYS WAX IS OFTEN INCORPORATED IN PRINTING INK TO IMPROVE THE RHEOLOGICAL PROPERTIES THEREOF AND ALSO BECAUSE THEN THE INK WILL NOT COME OFF ONTO THE NEXT SHEET IN A PILE OF FRESHLY PRINTED PAPER. IN THIS CONNECTION IT SHOULD BE NOTICED  
 20 THAT WAITING UNTIL THE INK IS THOROUGHLY DRY IS NOT CONSISTENT WITH THE HIGH PRODUCTION RATES APPLIED NOWADAYS. SAID NOT COMING-OFF SEEMS TO BE DUE TO THE PROTRUSION OF THE WAX PARTICLES FROM THE INK, BECAUSE OF WHICH THE PRINTED SHEET MAKES NO REAL CONTACT WITH THE NEXT SHEET. HOWEVER, THE VARNISH APPLIED TO THUS PRINTED PAPER IS REMOVED EASILY, EVEN BY RUBBING WITH THE FINGERS ONLY.

25 SAID WAX IS INCORPORATED INTO THE INK BY STIRRING IN A WAX DISPERSION. THIS WAX DISPERSION CAN BE MADE IN SEVERAL WAYS; THE MOST COMMON WAY IS MELTING THE WAX WITH THE APPROPRIATE AMOUNT OF HYDROCARBON OIL OR MIXTURE OF OIL AND BINDER AT ELEVATED TEMPERATURES UNDER VIGOROUS AGITATION AND SLOWLY COOLING DOWN THE BLEND. ANOTHER METHOD IS TO DISSOLVE THE WAX IN A REAL SOLVENT FOR THE WAX AT  
 30 ELEVATED TEMPERATURES. THEN MIXING WITH A CO-SOLVENT IN WHICH THE WAX IS LESS SOLUBLE, AND THEN COOLING THE MIXTURE TO ROOM TEMPERATURE. THE NECESSARY TEMPERATURE INCREASE DEPENDS IN BOTH CASES ON THE NATURE OF THE WAX COMPONENT; TYPICAL VALUES ARE FROM 80° TO 140°C. IN THIS MANNER VERY FINE DISPERSIONS OF WAX IN THE LIQUID PHASE (PARTICLES < 10 MICROMETER) CAN BE OBTAINED.

35 NOW WE HAVE FOUND THAT PAPER PRINTED WITH WAX-CONTAINING INK MAY BE COATED WITH A WELL ADHERING LAYER OF VARNISH WHICH WILL REPEL DIRT AND ADD TO THE USEFUL LIFE OF THE THUS TREATED PAPER IF THE WAX IN THE INK IS MICRONIZED WAX AND THE VARNISH IS A CELLULOSE ESTER OR ETHER.

40 THUS THE PRESENT INVENTION PROVIDES PAPER OBJECTS PRINTED WITH INK AND COATED WITH A PROTECTIVE LAYER, HAVING AS CHARACTERIZING FEATURES THAT THE PRINTING INK CONTAINS 1-10% BY WEIGHT OF MICRONIZED WAX AND THAT THE PROTECTIVE COATING CONSISTS FOR A MAJOR PART OF CELLULOSE ESTER OR ETHER.

IN THE PRESENT SPECIFICATION AND CLAIMS "MICRONIZED WAX" IS UNDERSTOOD WAX THAT HAS BEEN SUBJECT TO A SPECIAL GRINDING TREATMENT BY WHICH IT CONSISTS FOR THE  
 45 GREATER PART OF PARTICLES OF 30 MICROMETER AND SMALLER AND FOR A MINOR PART OF PARTICLES SMALLER THAN 10 MICROMETER. THE MICRONIZING OF WAX IS DESCRIBED BY T.C. PATTON IN "PAINT FLOW AND PIGMENT DISPERSION", 2ND ED. (JOHN WILEY & SONS, NEW YORK, 1979) PAGE 378 AND BY H.F. PAYNE IN "ORGANIC COATING TECHNOLOGY", VOL. II (JOHN WILEY & SONS, NEW YORK, 1960) PAGES 715 AND 777. AND THE PRODUCT MAY BE OBTAINED FROM E.G.  
 50 HOECHST A.G. IN GERMANY OR FROM CERA CHEMIE AT DEVENTER (THE NETHERLANDS).

THE MICRONIZED WAX MAY HAVE VARIOUS COMPOSITIONS AND BE OF VARIOUS ORIGIN. E.G. IT MAY BE POLYETHYLENE, POLYPROPENE, ETHENE-PROPENE COPOLYMER, HYDROCARBON RESIN OR MONTAN WAX, OR IT MAY BE AN ANIMAL OR VEGETABLE WAX SUCH AS BEES WAX, CARNAUBA WAX OR CANDELLILA WAX, ETC. BY PREFERENCE IT IS POLYETHYLENE.

SAID MICRONIZED WAX IS NOT DISPERSED INTO THE INK BY MELTING IT WITH MINERAL OIL OR A MIXTURE OF OIL AND BINDER BUT BY KNEADING OR BLENDING IT WITH THE OIL, THE INK BINDER OR MIXTURE THEREOF AT ROOM TEMPERATURE OR SLIGHTLY ELEVATED TEMPERATURE, IN SUCH A WAY THAT THE PARTICLE SIZE IS MODIFIED HARDLY OR NOT AT ALL.

5 THE INK MAY CONTAIN 1-10% BY WEIGHT OF MICRONIZED WAX. BY PREFERENCE IT CONTAINS 1-5% BY WEIGHT OF MICRONIZED WAX.

THE INK TO BE USED ACCORDING TO THE INVENTION MAY CONTAIN, APART FROM THE MICRONIZED WAX, ALL THE INGREDIENTS THAT ARE USUAL FOR PRINTING INKS. THE DRYING OF THE INK MAY BE CAUSED BY ABSORPTION BY THE PAPER FIBRES AND/OR PENETRATION OF THE  
10 LIQUID CONSTITUENTS IN THE PAPER FIBRES, OR BY EVAPORATION OF SOLVENT OR IN ANY OTHER WAY. THE INVENTION IS PARTICULARLY USEFUL FOR PASTE INK WHICH DRIES BY 20 REACTION WITH OXYGEN FROM THE AIR.

AS BINDER AND PIGMENT ANY COMPOSITION KNOWN THEREFOR IS APPLICABLE, AND IN PHYSICALLY DRYING INKS ANY USUAL SOLVENT MAY BE APPLIED.

15 MOREOVER THE INK MAY CONTAIN ANY OF THE KNOWN AND USUAL ADDITIVES, SUCH AS FILLERS AND DRYING AGENTS AND MIXTURES THEREOF.

THE PROTECTIVE COATING HAS TO CONSIST SUBSTANTIALLY OF CELLULOSE ESTER OR ETHER. ADDITIONALLY IT WILL GENERALLY CONTAIN PLASTIFIER, GENERALLY 1 PART BY WEIGHT FOR 5 TO 20 PARTS BY WEIGHT OF CELLULOSE DERIVATIVE. EXAMPLES OF SUITABLE  
20 PLASTIFIERS ARE THE ALKYL ESTERS OF DICARBOXYLIC ACIDS SUCH AS, DI-OCTYL AND DIBENZYL ESTERS OF SUCCINIC, ADIPIC AND PHTHALIC ACIDS, LOW-MOLECULAR ACRYL DERIVATIVES. DIACYL DERIVATIVES OF SUCROSE, SORBITAN AND OXYALKYLATED SORBITAN SUCH AS SUCROSE ACETATE, PROPIONATE, CAMPHER, ETC.. ETC. MOREOVER MINOR AMOUNTS OF OTHER CONSTITUENTS SUCH AS OPTICAL BRIGHTENERS MAY BE PRESENT.

25 THE CELL, 0-50% BY WEIGHT OF PROPIONYL GROUPS AND 0-60% BY WEIGHT OF BUTYRYL GROUPS, THE HYDROXYL GROUP CONTENT BEING FROM 0 TO 5 5% BY WEIGHT.

BY PREFERENCE THE CELLULOSE DERIVATIVE IS A MIXED ESTER CONTAINING BOTH ACETYL GROUPS AND PROPIONYL AND/OR BUTYRYL GROUPS, AS SUCH ESTERS ARE SOLUBLE IN ALCOHOL/WATER MIXTURES WHEREAS CELLULOSE ACETATE REQUIRES KETONES LIKE ACETONE  
30 AND BUTANONE FOR DISSOLVING. CONSEQUENTLY A PREFERRED COMPOSITION IS 5-20% BY WEIGHT OF ACETYL GROUPS AND 20-40% OF PROPIONYL AND/OR BUTYRYL GROUPS, THE HYDROXYL GROUP CONTENT BEING ABOVE 3%, BY PREFERENCE 4-5.5%. WITH HIGHER HYDROXY-GROUP LEVELS THE CONTENTS OF PROPIONYL AND/OR BUTYRYL GROUPS ALSO MAY BE SOMEWHAT HIGHER, UP TO 41%, RESP. 44%.

35 IF THE CELLULOSE DERIVATIVE IS AN ETHER IT MAY BE ANY CELLULOSE ETHER THAT IS NOT WATER SOLUBLE, E.G. ANY METHYL CELLULOSE, ETHYL CELLULOSE OR BUTYL CELLULOSE OF SUFFICIENTLY HIGH SUBSTITUTION DEGREE.

PROCESSES FOR PREPARING THE ABOVE-MENTIONED CELLULOSE DERIVATIVES ARE SUFFICIENTLY KNOWN AND NEED NOT BE DISCUSSED HERE IN DETAIL. MOREOVER ALL THESE  
40 CELLULOSE DERIVATIVES MAY BE OBTAINED COMMERCIALY, E. G. FROM EASTMAN KODAK AND DU PONT DE NEMOURS IN THE U.S., BAYER A.G IN GERMANY, GEVAERT IN BELGIUM. AND OTHERS.

THE INVENTION ALSO COMPRISES A PROCESS FOR PRODUCING THE ABOVE-DESCRIBED PRINTED PAPER HAVING A PROTECTIVE COATING, WHEREIN PAPER IS PRINTED WITH AN INK  
45 WHICH COMPRISES BINDER, PIGMENT AND OPTIONALLY SOLVENT, DRYING AGENT AND/OR OTHER AUXILIARIES, AND SUBSEQUENTLY IS COVERED WITH A LAYER OF VARNISH. THE PROCESS ACCORDING TO THE INVENTION IS CHARACTERIZED IN THAT THE INK CONTAINS 1-10% BY WEIGHT OF MICRONIZED WAX AND IN THAT THE PROTECTIVE COATING CONSISTS FOR A MAJOR PART OF CELLULOSE ESTER OR ETHER.

50 THE COMPOSITION OF THE INK AND THE MICRONIZED WAX MAY BE SELECTED ALONG THE ABOVE-DISCUSSED LINES. THE INK MAY BE APPLIED BY ANY OF THE KNOWN PRINTING TECHNIQUES, E.G. BY A RELIEF, INTAGLIO OR SILK SCREEN PROCESS OR BY PLANOGRAPHY.

THE COMPOSITION OF THE COATING HAS BEEN DISCUSSED ABOVE. AS THE CELLULOSE ESTER OR ETHER COATING WILL GENERALLY BE APPLIED AS A SOLUTION THE CELLULOSE DERIVATIVE IS BY PREFERENCE A MIXED ESTER CONTAINING BOTH ACETYL AND PROPIONYL AND/OR BUTYRYL GROUPS, AS SUCH MIXED ESTERS ARE SOLUBLE IN ALCOHOL/WATER MIX-  
 5 TURES AND DO NOT REQUIRE KETONES FOR DISSOLUTION AS DOES CELLULOSE ACETATE. ALCOHOL/WATER MIXTURES ARE PREFERRED ABOVE KETONES BECAUSE THEY ARE SCARCELY INFLAMMABLE OR NOT AT ALL AND BECAUSE THEIR TOXICITY IS GENERALLY LOWER.

THE ACTUAL WAY IN WHICH THE COATING SOLUTION IS APPLIED IS NOT CRITICAL AND IT MAY BE DONE BY SPRAYING, DIPPING, ROLLER COATING OR WHATEVER TECHNIQUE THAT IS CONVE-  
 10 NIENT UNDER THE PREVAILING CONDITIONS, DURING OR AFTER APPLYING THE COATING SOLUTION, THE SOLVENT IS EVAPORATED AND IT MAY BE RECOVERED, BOTH FOR ECONOMICAL AND ENVIRONMENTAL CONSIDERATIONS.

APPLICANT DOES NOT WANT TO BE BOUND BY ANY THEORY, BUT HE BELIEVES THE FAVOURABLE RESULTS OF THE COMBINATION OF MICRONIZED-WAX-CONTAINING INK AND CEL-  
 15 LULOSE DERIVATIVES TO BE DUE TO A BETTER WETTING OF THE WAX PARTICLES AND THE INK-BINDER PHASE BY THE CELLULOSE DERIVATIVE. THE REPELLANCE OF DIRT BY THE CELLULOSE ESTER OR ETHER MAY BE DUE TO THE RATHER HYDROPHILIC NATURE OF SAID CELLULOSE DERIVATIVES BUT, AGAIN, THESE ARE JUST THEORETICAL CONSIDERATIONS.

THE INVENTION MAY FIND A GREAT VARIETY OF APPLICATIONS, AMONGST WHICH BANK  
 20 NOTES AND CURRENCY NOTES, IDENTITY CARDS AND OTHER OFFICIAL CERTIFICATES, SAMPLE HOLDERS AND SAMPLE DISPLAYS, SEASON TICKETS, CATALOGUES AND SINGLE CATALOGUE CARDS, MAPS AND CITY PLANS, PLAYING CARDS, DISPLAYS OF DIRECTIONS FOR USE AND OTHER INSTRUCTIONS, BOTANICAL AND ZOOLOGICAL GUIDES, ETC.

THE INVENTION WILL NOW BE ILLUSTRATED BY A FEW NON-RESTRICTING EXAMPLES.

25

#### EXAMPLE 1

PAPER HAVING A THICKNESS OF 100 G/M<sup>2</sup> WAS PRINTED WITH AN INK HAVING THE FOLLOW-  
 30 ING COMPOSITION:

	ALKYD RESIN (BINDER)	59% BY WEIGHT
	CARBON BLACK (PIGMENT)	20% "
35	SILICA GEL (FILLER)	10% "
	WAX DISPERSION	10% "
	DRYING AGENT MIXTURE	1% "

40

THE COMPOSITION OF THE WAX DISPERSION WAS:

MICRONIZED POLYETHYLENE

45	("CERIDUST 3620" FROM HOECHST AG)	30% BY WEIGHT
	ALKYD RESIN	10% "
	MINERAL OIL	60% "

IT WILL BE APPRECIATED THAT THIS INK CONTAINS 3% BY  
 50 WEIGHT OF MICRONIZED WAX.

THE PRINTED SHEETS WERE STACKED WITHOUT ANY DIFFICULTY, NO COMING OFF OF THE BLACK INK ONTO THE NEXT SHEETS WAS OBSERVED. NEXT THEY WERE COATED BY SPRAYING  
 55 AT SHORT DISTANCE WITH A COATING SOLUTION HAVING THE FOLLOWING COMPOSITION IN A RATE TO GIVE A COATING WEIGHT OF 2 G/M<sup>2</sup>:

	CELLULOSE ACETATE PROPIONATE	13% BY WEIGHT
	SUCROSE ACETATE ISOBUTYRATE	2% "
6	ISOPROPANOL	73% "
	WATER	12% "

THE CELLULOSE ACETATE PROPIONATE WAS THE PRODUCT "CAP 504/0.2" FROM EASTMAN  
 10 KODAK, HAVING AN ACETYL GROUP CONTENT OF 2.5%, A PROPIONYL GROUP CONTENT OF 40%  
 AND A HYDROXYL GROUP CONTENT OF 5.0% AND HAVING A VISCOSITY OF 0.2 SECONDS  
 (ESTIMATED ACCORDING TO ASTM D-1343, IN THE SOLUTION DESCRIBED AS FORMULA A, ASTM D-  
 817).

THE COATED PAPER WAS DRIED WITH A CURRENT OF AIR OF ABOUT 80-90°C. IT LOOKED  
 16 EXCELLENT AND KEPT WELL WHEN FOLDED AND HANDED OVER FREQUENTLY.

## EXAMPLE 2

20 THE PROCESS OF EXAMPLE 1 WAS REPEATED, EXCEPT THAT THE COMPOSITION OF THE  
 COATING SOLUTION WAS NOW AS FOLLOWS:

	CELLULOSE ACETATE BUTYRATE (1)	5% BY WEIGHT
26	CELLULOSE ACETATE BUTYRATE (2)	10% "
	DIOCTYLPHTHALATE	1% "
	ETHYL ACETATE	10% "
30	BUTYL ACETATE	15% "
	ETHANOL	59% "

(1) THIS CELLULOSE ACETATE BUTYRATE WAS THE PRODUCT "CA 553/0.4" FROM EASTMAN  
 35 KODAK, HAVING AN ACETYL GROUP CONTENT OF 2.0% BY WEIGHT,  
 A BUTYRYL GROUP CONTENT OF 47% BY WEIGHT  
 AND A HYDROXYL GROUP CONTENT OF 4.3% BY WEIGHT,  
 AND HAVING A VISCOSITY OF 0.4 SECONDS (ESTIMATED ACCORDING TO ASTM D-1343 IN THE  
 SOLUTION DESCRIBED AS FORMULA A, ASTM D-8-17).

(2) THIS CELLULOSE ACETATE BUTYRATE WAS THE PRODUCT "CELLIT BP-300" FROM  
 40 BAYER A G., HAVING AN ACETYL GROUP CONTENT OF 14% BY WEIGHT, A BUTYRYL GROUP  
 CONTENT OF 37% BY WEIGHT,  
 AND A HYDROXYL GROUP CONTENT OF 1.2% BY WEIGHT,  
 AND HAVING A VISCOSITY OF 30-60 MP.A.SEC. ESTIMATED ACCORDING TO DIN 53015 WITH A 20%  
 46 SOLUTION IN ACETONE/ETHANOL 9 :1 AT 23°C.

50

55

EXAMPLE 3

PAPER HAVING A THICKNESS OF 100 G/M<sup>2</sup> WAS PRINTED WITH AN INK HAVING THE FOLLOWING COMPOSITION:

5	CELLULOSE ACETATE PROPIONATE (BINDER)	5% BY WEIGHT
	PHTHALOCYANINE BLUE (PIGMENT)	20% BY WEIGHT
	ETHANOL	52% BY WEIGHT
10	ETHYL ACETATE	22% BY WEIGHT
	WAX DISPERSION ("CERIDUST VP 3910"	
	FROM HOECHST A.G.)	1% BY WEIGHT

15

THE PRINTED SHEETS WERE DRIED TO REMOVE THE SOLVENT AND WERE THEN STACKED WITHOUT DIFFICULTY, NO COMING OFF BEING OBSERVED AT ALL. AFTER THE STACK OF PRINTED PAPER WAS FULLY DRY, THE SHEETS WERE COATED IN THE WAY DESCRIBED IN EXAMPLE 1 WITH A VARNISH COMPOSITION AS SPECIFIED IN EXAMPLE 1. THE COATED SHEETS WERE THEN DRIED

20 WITH AIR OF ABOUT 90°C. THE FINISHED PRODUCT LOOKED EXCELLENT AND KEPT WELL WHEN FOLDED AND HANDED OVER FREQUENTLY.

Claims

25

1. PAPER OBJECT PRINTED WITH INK AND COATED WITH A PROTECTIVE LAYER, CHARACTERIZED IN THAT THE PRINTING INK CONTAINS 1-10% BY WEIGHT OF MICRONIZED WAX AND IN THAT THE PROTECTIVE COATING CONSISTS FOR A MAJOR PART CELLULOSE ESTER OR ETHER.

30

2. PAPER OBJECT ACCORDING TO CLAIM 1, CHARACTERIZED IN THAT THE PROTECTIVE LAYER CONSISTS SUBSTANTIALLY OF CELLULOSE ESTER CONTAINING 1-40% BY WEIGHT OF ACETYL GROUPS, 0-50% BY WEIGHT OF PROPIONYL GROUPS AND 0-60% BY WEIGHT OF BUTYRYL GROUPS, THE HYDROXYL GROUP CONTENT BEING FROM 0 TO 5.5% BY WEIGHT.

35

3. PAPER OBJECT ACCORDING TO CLAIM 2, CHARACTERIZED IN THAT THE PROTECTIVE LAYER CONSISTS SUBSTANTIALLY OF CELLULOSE ESTER CONTAINING 5-20% BY WEIGHT OF ACETYL GROUPS AND 20-40% BY WEIGHT OF PROPIONYL AND/OR BUTYRYL GROUPS, THE HYDROXYL GROUP CONTENT BEING 4-5.5% BY WEIGHT.

40

4. PAPER OBJECT ACCORDING TO ANY OF THE PRECEDING CLAIMS, CHARACTERIZED IN THAT THE PROTECTIVE COATING CONTAINS 1 PART BY WEIGHT OF PLASTIFIER FOR 5 TO 20 PARTS BY WEIGHT OF CELLULOSE DERIVATIVE.

5. PAPER OBJECT ACCORDING TO ANY OF THE PRECEDING CLAIMS, CHARACTERIZED IN THAT THE PRINTING INK CONTAINS 1-5% BY WEIGHT OF MICRONIZED WAX.

6. PAPER OBJECT ACCORDING TO ANY OF THE PRECEDING CLAIMS, CHARACTERIZED IN THAT THE MICRONIZED WAX IS MICRONIZED POLYETHENE.

45

7. A PROCESS FOR PRODUCING PAPER OBJECTS PRINTED WITH INK AND COATED BY A PROTECTIVE LAYER, WHEREIN PAPER IS PRINTED AN INK WHICH COMPRISES BINDER, PIGMENT AND OPTIONALLY SOLVENT, DRYING AGENT AND OTHER AUXILIARIES, AND SUBSEQUENTLY IS COVERED WITH A LAYER OF VARNISH, CHARACTERIZED IN THAT THE INK CONTAINS 1-10% BY WEIGHT OF MICRONIZED WAX AND IN THAT THE PROTECTIVE COATING CONSISTS FOR A MAJOR PART OF CELLULOSE ESTER OR ETHER.

50

55



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	FR-A- 523 278 (F. DUFAY) * Whole document *	1-7	B 41 M 7/02 C 09 D 11/12 C 09 D 11/02
Y	--- CHEMICAL ABSTRACTS, vol. 84, no. 10, 8th March 1976, page 102, abstract no. 61311h, Columbus, Ohio, US; K. RIEGER: "Micronized polyethylene waxes for printing ink", & INF. CHIM. 1975, 148, 269-72	1-7	
Y	--- FR-A-2 127 587 (KODAK) * Whole document *	1-7	
A	--- DE-A-1 924 545 (HOECHST) * Whole document *	1-7	
A	--- BULLETIN OF THE INSTITUTE OF PAPER CHEMISTRY, vol. 26, no. 9, 1956; H.E. CRAWFORD: "New plastic coating for printing finishing", & PAPER TRADE J. 140, no. 13:24 (March 26, 1956) * Abstract *	1-7	TECHNICAL FIELDS SEARCHED (Int. Cl.4)  B 41 M 7/00 C 09 D 11/00
A	--- SEIFEN-ÖLE-FETTE-WACHSE, vol. 104, no. 6, April 1978, page 169; "Einarbeitung von Wachsen in Druckfarben" * Whole document *	1-7	
--- -/-			
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10-04-1987	Examiner RASSCHAERT A.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			





EP 86 20 1435

DOCUMENTS CONSIDERED TO BE RELEVANT			Page 2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	FR-A-2 126 765 (KODAK) * Whole document *	1-7	
A	--- US-A-2 230 876 (E. WYSONG) * Whole document *	1-7	
A	--- RESEARCH DISCLOSURE, October 1977, disclosure no. 16204, Hampshire, GB; "Crosslinkable cellulosic compositions that will not stick to processing equipment at high temperatures" * Whole document *	1-7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10-04-1987	Examiner RASSCHAERT A.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

This Page Blank (uspto)